

IN THE DRAWINGS

Please amend Figures 4 and 6 per the attached annotated copy of Figures 4 and 6, wherein the changes are noted in red. No new matter is believed entered with entry of the proposed changes. Applicant requests to defer the submission of replacement drawings until allowable subject matter and/or claims have been indicated.

REMARKS

Applicant thanks the examiner for his attention to the application. Applicant has considered the cited references and amended the claims to forms believed distinguishable thereover.

Section 2 of the action:

The examiner has objected to the specification in regard to antecedence. The foregoing amendments to the specification and drawings however should overcome this objection. No new matter has been added with the proposed amendments.

Sections 3 and 4 of the action:

Claims 24, 26, 32, 33 and 35 stand rejected under 35 USC §112 for lack of support under the specification. The claims have been amended to overcome the objections.

Additionally, in regard to the objection to claim 24, applicant directs the examiner's attention to paragraph (0048) which reads as follows:

“With this invention, either a high oil pressure or compressed air atomization method can be used. It is simply a matter of inserting the correct type of atomizing nozzle according to the method required. Air atomizing nozzles have compressed air passageways whereas high pressure nozzles do not. If a high pressure nozzle is used, the air passageway is blocked due to the design of the nozzle. The compressed air passageway is provided to give the end user the benefit of choosing which atomization method to use.”

The foregoing passage supports the previously objectionable language, although which has been removed. The passage further supports the language of claims 27, 30, 32, 41, 42 and any other claims with related features.

In regard to the objection to claims 32 and 33, applicant has further submitted amendments to the specification and corresponding amendments to Figures 4 and 6 to call out the depicted O'ring seal which clearly can be seen to seal the aft end of the nozzle in the channel section or cavity 26. As is readily interpreted from the Figures, the seal 27 prevents oil from passing around the nozzle 2 into the channel section or cavity 42 and mixing with the air. Mixing occurs only and immediately upon the oil being emitted from the nozzle. Support is therefore provided for all claims including the related features of the invention.

Sections 5 and 6 of the action:

Claims 21-39 stand rejected as being obvious under 35 USC §103 over Wilson (5,156,139) in view of Leach (2,976,918) and Bender (5,067,894).

Wilson is cited for showing an oil burner having passageways 14, 16 and 22; nozzle 8 with oil and atomizing ports; and undulations at the passage 22 that are asserted to be represent applicants convoluted and riser portions.

Upon closer inspection of Wilson, it is particularly noted that the passageway 14 is provided to support **electric heaters**. See the discussion at column 6, lines 38-42 and reference to "heating elements", which clearly precludes any extension to a liquid heater. The **closed-ended** heating element passageway 14 is displaced to the side of the fuel passage segments 23-5 and air passage 16.

In distinction to applicant's continuous uninterrupted passageways/channels, Wilson's fuel passage 22 is defined by input 22a and **broken and discontinuous** channel segments 23. A fuel flow path is established only upon fitting the plugs 30 to the block to establish the connecting segments 24 and 25. **With regard to the examiner's mention of col. 6, lines 10-27, seals are provided only to prevent leakage from the tops of the plugs 30 which is distinguishable from applicant's sealing of his oil channel 20-26.**

Wilson's air passageway 16, otherwise, is displaced to the side of the segments 23-25 and flow director plugs 30, col. 5, lines 37-46. The passageway 16 terminates at the output segment 22B. Even if the output segment 22B is interpreted to constitute a cavity, the air cavity lies aft of the cavity that contains Wilson's nozzle 8. Applicant's oil is admitted to the distribution port of the nozzle in the first cavity. This is aft of the air which is admitted to the second cavity and which still is isolated from mixing with the oil until the oil is emitted from the nozzle.

Nor does Wilson provide a seal or any other mechanism in the adjoining outlet segment 22B to isolate any air flow from the fuel or in any way prevent the air from mixing with the oil prior to being ejected from the nozzle 8 as provided for in applicant's assembly.

The lateral displacement of Wilson's heater passage 14 and air passage 16 to the side of the fuel segments 23-25 also precludes any portion of his heater passage 14 from extending through the layer containing the fuel segments 23-25 and does obviate applicant's riser channel 25.

In short, Wilson's fuel and air are heated in conventional fashion with an electric heater mounted in the passageway 14 and any admitted air is not sealed or isolated from mixing with the oil as provided for with applicant's claimed assembly.

Most significantly, **Wilson like all of the cited references does not show, suggest, infer or provide any motivation to include any internal passageway at a burner for directing a heated liquid through the interior passageway or to adapt his closed ended heater passageway 14 to accommodate liquid flow to heat the air and/or oil directed to the nozzle.**

The only reference to an alternative heating construction is made at column 6, line 60 through column 7, line 8 which suggests modifying the assembly 10 to mount in a heated water bath. No suggestion is made to provide internal liquid passages or of how to construct or configure same. Instead, **Wilson, like Bender, uses electric heaters to elevate the temperature of his fuel and any purported modification to modify Wilson to teach applicant's claimed invention is therefore not supported from Wilson. Moreover, any such modification would require extensive changes and undue experimentation not taught, suggested or inferred or provided by any motivation from Wilson.**

Leach is asserted to teach an oil burner assembly. Attention however is drawn to the reference to "preheater" at the patent title. See also column 2, lines 53-55, which references a burner 100 and furnace 101; neither of which are shown, but clearly which are understood to be located significantly apart from the preheater assembly of Figure 1. Leach's preheater is intended only to partially raise the temperature of the systems fuel to facilitate fuel flow prior to being directed to an associated burner.

While Leach might reside in the same field as applicant's invention, Leach does not disclose or suggest an integral, oil burner assembly, heated with liquid passed through bored channels of a solid manifold containing a fuel nozzle at the burner.

The most relevant aspect of Leach to applicant's invention is the gas-fired starting preheater 78 and which again does not teach or suggest a liquid heating oil and/or air directly at a burner.

Leach, otherwise, shows a housing 12 constructed from a section of pipe which is configured to provide a liquid bath. The liquid bath surrounds independently mounted liquid and oil containing conduits 34, 39. The purpose of the preheater is to **partially elevate** the temperature of oil circulated by pump 54 with water circulated through the housing by pump 70.

The heated oil, in turn, is directed to a separate gas-fired, starting preheater 78, where the temperature is further elevated before being supplied to an undisclosed and substantially removed burner 100 of an undisclosed furnace 101. **Leach thus teaches a heating system that requires two fuel heaters and neither of which heaters is directly connected to the fuel nozzle at the burner 100.**

In spite of the teachings of Leach, the examiner argues that the reference in the background of Leach at column 1, lines 27-35,

"Certain ones of the systems proposed for overcoming these difficulties have relied upon electrical or gas heater units disposed adjacent to certain parts of the fuel oil supply line to heat the oil as it flows towards the burner, but these do not uniformly heat the oil so as to maintain the oil flowing to the burner at a

substantially constant temperature so that uniform control of the flame cannot be maintained."

provides the motivation and suggestion to modify Wilson to include a heated liquid passageway such as taught by Leach in Wilson.

Applicant disagrees. Leach's comment provides no motivation, inference, suggestion or teaching to any such extension and modification. The passage acknowledges nothing more than that electrical heater assemblies disposed adjacent to certain parts of the fuel oil supply line have not adequately heat the supplied fuel. **Nothing is suggested from this passage that a liquid heat source should be directly applied at the burner.** Moreover, even when heaters have been applied directly at the burner, the most relevant cited art (i.e. Wilson and Bender) only suggests the use of electric heaters.

Taken in context with the actual teachings of Leach, **the passage teaches nothing more than the use of a displaced water bath preheater to surround and heat an oil supply conduit supported in the bath. The noted casual comment of Leach, consequently provides no motivation to modify Wilson as suggested.** Nor does the comment or any other teaching of Leach provide any particular teaching as to how to without undue experimentation to modify Wilson to arrive at the asserted assembly that obviates the claimed invention.

At most, Leach's comment redundantly supports Wilson's comment (col. 6, line 60 – col. 7, line 8) that Wilson's nozzle assembly 10 can be secured within a hot water tank. The examiner's extension of Leach and combination with Wilson is therefore taken

to be an impermissible hindsight reconstruction that is not supported from any teaching, suggestion, inference or motivation provided from the references.

Bender is cited for showing an igniter 107, a fan/turbine 108, and oil pump 110 which the examiner conveniently and from hindsight combines with Wilson and/or Leach and argues obviates applicant's claims.

In short, nothing in the cited references alone or in combination discloses or suggests providing heated liquid passageway(s) within a solid manifold supporting a nozzle to heat oil immediately prior to emission at the nozzle and combustion. Nor do the cited references alone or in combination teach the concurrent isolation and liquid heating of atomizing air from the heated oil and especially not within a manifold as described and claimed by applicant.

The thermal conductivity of applicant's manifold body is such that heat is readily transferred from the liquid to the oil and air. The manifold body provides unbroken, continuous, convoluted oil directing passageway(s) 20-26 (fig. 5), heated liquid passageway(s) 30-32 (fig. 3) and atomizing air passageway(s) 40-42 (figs. 3,4) whereby increased surface areas are provided to facilitate efficient heat transfer to the oil and air.

The passageways are also provided in displaced tiers. The oil directing passageway(s) 20-26 are provided at a lower level that lies parallel to and directly adjacent the heated liquid passageway(s) 30-32. The riser channel 25 extends through the level containing the heated liquid passageway(s) 30-32.

The air passageway(s) 40-42 extend parallel to and adjacent the heated liquid passageway(s) 30-32 (fig. 4). The passageway portions 41 are necked down and include

an unnumbered obstruction (fig. 3) to compress the atomizing air passing through the passageway(s) 40-42. As noted at the specification,

“Compressed air enters compressed air channel 40 and is heated by heat energy transferred from heated liquid channels 30, 31 and 32 to preheat device 1 as it passes through compressed air channels 41 and 42 to nozzle 2.”

No such narrowed passageways are provided at Wilson or any of the other cited references.

Moreover, the cited references do not teach isolating the heated oil via a seal (e.g. O’ring 27) from the air passageways 40-42.

The foregoing distinctions are particularly provided for at the amended independent method claim and apparatus claims. That is, each claims a manifold having internal channels/passageways that can couple to sources of oil, heated liquid and air. The manifold and passageways are configured in tiered layers such that heat from the heated liquid is transferred via the manifold material (not a water bath) to heat the oil and air immediately prior to being discharged from a nozzle. The liquid passageway is also mounted between the oil and air passageways and in which instance a riser channel is provided immediately prior to the nozzle to further enhance the heat transfer.

Where the nozzle includes atomizing ports, a source of air is coupled to the third passageway. The air is isolated from the oil and heated by thermal transfer from the manifold material and atomizes the hot oil as it is discharged from the nozzle. Seals are particularly provided to isolate and seal the heated oil from the air.

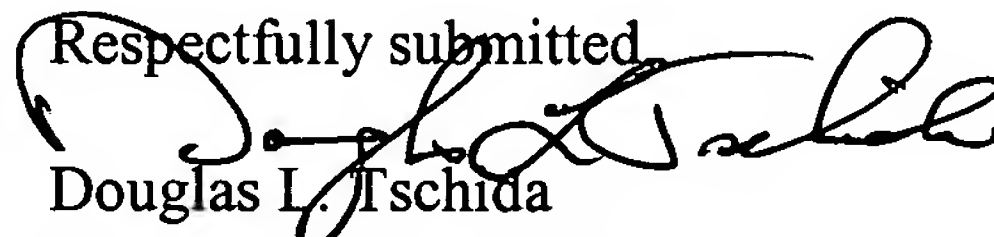
In further support to the non obviousness of applicant’s invention over the cited art and the assertion such a combination would be obvious to those skilled in the art,

attached are three letters, Exhibits A, B and C, which discuss or infer the commercial unavailability of any type of liquid heated burner manifold assembly as suggested by the examiner prior to applicant's product/invention. Also discussed are the advantages of applicant's burner assembly over electric heated assemblies and the inefficiencies of electric heater assemblies such as taught by Wison.

Applicant hereby also states that since the initial introduction of his burners, he has experienced expanding sales growth. The uniqueness and advantages of applicant's assembly have further resulted in the entry of numerous directly competitive products.

With the foregoing amendments to the specification, drawings and claims, the application is believed distinguishable and patentable over the art and in a condition for allowance. No new matter has been entered with any of the foregoing amendments. Applicant requests the examiner's reconsideration of the application and an early notice to the allowance thereof.

If any matters remain that can be handled with a telephone conference, the examiner is encouraged to contact the undersigned.

Respectfully submitted

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Enclosures